

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-14 (cancelled).

15. (New) A combustion control device of an internal combustion engine, comprising:
- a fuel injector which injects fuel for combustion in the internal combustion engine;
 - a valve which controls a pilot injection amount and a pilot injection timing of the fuel by the fuel injector;
 - a sensor which detects a parameter related to a specific gravity of a fuel burnt by the internal combustion engine; and
 - a programmable controller programmed to:
 - correct a target value of the pilot injection amount and a target value of the pilot injection timing each of which has been defined with respect to a reference fuel, based on the parameter, such that the pilot injection amount is increased while the pilot injection timing is retarded when the specific gravity of the fuel is higher than a specific gravity of the reference fuel; and
 - control the fuel injector so that the target values are realized.
16. (New) A combustion control device of an internal combustion engine, comprising:
- a fuel injector which injects fuel for combustion in the internal combustion engine;
 - a pressure control valve which controls a fuel injection pressure of the fuel injector;
 - a sensor which detects a parameter related to a specific gravity of a fuel burnt by the internal combustion engine; and
 - a programmable controller programmed to:
 - correct a target value of the fuel injection pressure which has been defined with respect to a reference fuel, based on the parameter, such that the fuel injection pressure is increased when the specific gravity of the fuel is higher than a specific gravity of the reference fuel; and

control the pressure control valve so that the target value is realized.

17. (New) A combustion control device of an internal combustion engine, comprising:

a device which adjusts a compression end in-cylinder temperature of the internal combustion engine;

a sensor which detects a parameter related to a specific gravity of a fuel burnt by the internal combustion engine; and

a programmable controller programmed to:

correct a target value of the compression end in-cylinder temperature which has been defined with respect to a reference fuel, based on the parameter; and

control the compression end in-cylinder temperature adjusting device so that the target value is realized.

18. (New) The combustion control device as defined in Claim 17, wherein the compression end in-cylinder temperature adjusting device comprises a turbocharger for supercharging an intake air of the internal combustion engine, the turbocharger comprising a variable nozzle and increasing a supercharging pressure of the intake air according to a decrease of an opening of the variable nozzle, and the controller is further programmed to decrease the opening of the variable nozzle when the specific gravity of the fuel is higher than a specific gravity of the reference fuel.

19. (New) A combustion control device of an internal combustion engine, comprising:

a device which adjusts an intake air swirl of the internal combustion engine;

a sensor which detects a parameter related to a specific gravity of a fuel burnt by the internal combustion engine; and

a programmable controller programmed to:

correct a target value of the intake air swirl which has been defined with respect to a reference fuel, based on the parameter; and

control the intake air swirl adjusting device so that the target value is realized.

20. (New) The combustion control device as defined in Claim 19, wherein the intake air swirl adjusting device comprises a swirl control valve which throttles an intake cross-

sectional area of the internal combustion engine, and the controller is further programmed to decrease an opening of the swirl control valve when the specific gravity of the fuel is higher than a specific gravity of the reference fuel.

21. (New) A combustion control device of an internal combustion engine, comprising:

- a combustion adjusting device which adjusts a combustion-related element of the internal combustion engine;

- a sensor which detects an intake air flowrate of the internal combustion engine;

- a sensor which detects a rotation speed of the internal combustion engine;

- a sensor which detects a load of the internal combustion engine;

- a sensor which detects an oxygen concentration of an exhaust gas of the internal combustion engine; and

- a programmable controller programmed to:

- supply fuel to the internal combustion engine according to a mass of a reference fuel determined based on the rotation speed and the load of the internal combustion engine;

- calculate an air amount of an air-fuel mixture burnt by the internal combustion engine from the intake air flowrate and the rotation speed of the internal combustion engine;

- calculate an air-fuel ratio of the air-fuel mixture burnt by the internal combustion engine from the oxygen concentration of the exhaust gas;

- calculate a real fuel weight contained in the air-fuel mixture burnt by the internal combustion engine from the air-fuel ratio and the air amount of the air-fuel mixture;

- calculate a specific gravity of the fuel supplied to the internal combustion engine from the ratio of the real fuel weight and the mass of the reference fuel;

- correct a target value of the element which has been defined with respect to the reference fuel, based on the specific gravity of the fuel supplied to the internal combustion engine; and

- control the combustion adjusting device so that the target value is realized.

22. (New) The combustion control device as defined in Claim 21, wherein the internal combustion engine comprises an exhaust gas recirculation device which recirculates part of

an exhaust gas of the internal combustion engine to an intake air thereof, and the controller is further programmed not to calculate the specific gravity of the fuel supplied to the internal combustion engine when the exhaust gas recirculation device is operating.

23. (New) The combustion control device as defined in Claim 22, wherein the device further comprises a sensor which detects a temperature of the internal combustion engine, and the controller is further programmed to correct the target value of the element based on the specific gravity of the fuel supplied to the internal combustion engine and the temperature of the internal combustion engine, when the specific gravity of the fuel has been calculated.

24. (New) The combustion control device as defined in Claim 23, wherein the controller is further programmed to correct the target value of the element based only on the temperature of the internal combustion engine when the specific gravity of the fuel supplied to the internal combustion engine has not been calculated.

25. (New) A combustion control device of an internal combustion engine, comprising:

- means for adjusting a combustion-related element of the internal combustion engine;
- means for detecting an intake air flowrate of the internal combustion engine;
- means for detecting a rotation speed of the internal combustion engine;
- means for detecting a load of the internal combustion engine;
- means for detecting an oxygen concentration of an exhaust gas of the internal combustion engine;
- means for supplying fuel to the internal combustion engine according to a mass of a reference fuel determined based on the rotation speed and the load of the internal combustion engine;
- means for calculating an air amount of an air-fuel mixture burnt by the internal combustion engine from the intake air flowrate and the rotation speed of the internal combustion engine;
- means for calculating an air-fuel ratio of the air-fuel mixture burnt by the internal combustion engine from the oxygen concentration of the exhaust gas;
- means for calculating a real fuel weight contained in the air-fuel mixture burnt by the internal combustion engine from the air-fuel ratio and the air amount of the air-fuel mixture;

means for calculating a specific gravity of the fuel supplied to the internal combustion engine from the ratio of the real fuel weight and the mass of the reference fuel;

means for correcting a target value of the element which has been defined with respect to a reference fuel, based on the specific gravity of the fuel supplied to the internal combustion engine; and

means for controlling the adjusting means so that the target value is realized.

26. (New) A combustion control method for an internal combustion engine, the engine comprising a combustion adjusting device which adjusts a combustion-related element of the internal combustion engine, the method comprising:

detecting an intake air flowrate of the internal combustion engine;

detecting a rotation speed of the internal combustion engine;

detecting a load of the internal combustion engine;

detecting an oxygen concentration of an exhaust gas of the internal combustion engine;

supplying fuel to the internal combustion engine according to a mass of a reference fuel determined based on the rotation speed and the load of the internal combustion engine;

calculating an air amount of an air-fuel mixture burnt by the internal combustion engine from the intake air flowrate and the rotation speed of the internal combustion engine;

calculating an air-fuel ratio of the air-fuel mixture burnt by the internal combustion engine from the oxygen concentration of the exhaust gas;

calculating a real fuel weight contained in the air-fuel mixture burnt by the internal combustion engine from the air-fuel ratio and the air amount of the air-fuel mixture;

calculating a specific gravity of the fuel supplied to the internal combustion engine from the ratio of the real fuel weight and the mass of the reference fuel;

correcting a target value of the element which has been defined with respect to the reference fuel, based on the specific gravity of the fuel supplied to the internal combustion engine; and

controlling the adjusting device so that the target value is realized.